Standard 1

Number Sense and Computation

CORE STANDARD

Number Sense and Computation

Whole Numbers

Count, read, write and compare whole numbers up to 100. Represent numbers up to 100 as groups of tens and ones.

[Standard Indicators: 1.1.1, 1.1.4]

Addition and Subtraction

Model addition and subtraction using objects. Demonstrate fluency with addition facts and the corresponding subtraction facts for totals up to 20. Solve problems involving addition and subtraction.

[Standard Indicators: 1.1.5, 1.1.6]

1.1.1 Count, read, write, order, rename and compare whole numbers to at least 100.

Examples:

- Use a hundreds chart or manipulatives to compare numbers.
- Rename 87 as 50 + 37 and then rename in another way.

1.1.2 Name the number that is one more or one less than any number up to at least 100.

Example: Using a 0 – 99 chart and then without a chart name the number that is one more or one less than 79.

1.1.3 Match the ordinal numbers *first*, *second*, *third*, etc., with an ordered set to at least 10 items.

Example: Name the fifth child from the front of the line.

1.1.4 Show equivalent forms of whole numbers up to at least 100 as groups of tens and ones.

Example: Use base ten blocks to model 34 by using three longs and four ones, then 34 units, and finally by using two longs and 14 ones.

1.1.5 Solve problems involving addition and subtraction by using objects to model addition of numbers up to at least 100 (i.e., putting together, increasing) and by modeling the inverse operation of subtraction (i.e., taking away, comparing, finding the difference).

Examples:

- Using objects and a number line, show 75 equals 43 plus 32 more.
- Using objects and a number line, show the difference between 58 and 21.

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1.1.6 Demonstrate fluency with addition facts and the corresponding subtraction facts for totals up to at least 20.

Example: Practice the "making tens" strategy by completing the following fact families:

$10 = 6 + 4$	$4 = 10 - 6$
$10 = \square + 6$	$6 = 10 - \square$
$\square + 6 = 10$	$10 - \square = 6$
$\square + 4 = 10$	$\square - 6 = 4$

1.1.7 Pose a question and collect and represent data using pictures or picture graphs to answer the question.

Example: Decide on a question, ask your classmates, record their responses and then make a picture graph of the results.

Standard 2

Algebra and Functions

1.2.1 Write and solve equations involving addition.

Example: $7 = \square + 3$.

1.2.2 Create, extend and give a rule for number patterns using addition.

Example: Given the number pattern 4, 8, 12… , tell the next number and explain how you determined the pattern to be followed.

1.2.3 Solve problems using the identity principle for addition and subtraction.

Example: Ben put five apples in a bag. When he got to school he realized the bag had a hole. He recounted the apples, and he had five. How many apples did Ben lose through the hole?

Standard 3

Geometry and Measurement

CORE STANDARD

Geometry and Measurement

Geometric Shapes

Identify, describe, compare, sort and draw triangles, rectangles, squares and circles.

[Standard Indicator: 1.3.1]

Linear Measurement

Estimate and measure the length of an object to the nearest inch and centimeter.

[Standard Indicator: 1.3.2]

1.3.1 **Identify, describe, compare, sort and draw triangles, rectangles, squares and circles in terms of their attributes (position, shape, size and number of vertices). Use simple plane shapes to compose a given shape.**

Examples:

- Draw shapes on the sidewalk and play a game jumping to the shape that is called.
- Compare squares and rectangles listing how they are alike and different.

1.3.2 **Estimate and measure the length of an object to the nearest inch and centimeter.**

Example: Locate items around the classroom that are close to one inch or one centimeter and list them on a t-chart. Measure to see if you chose items close to the correct unit.

1.3.3 **Give the value of a collection of pennies, nickels and dimes up to $1.00.**

Example: Play "Memory" with cards that have money amounts and pictures of coins. Collect matches and then tell your partner the value of the money represented.

PROCESS STANDARDS

Indiana's Academic Standards for Mathematics describe the key content of each grade level and course, and students must develop conceptual understanding of this content. The American Diploma Project noted that, "beyond acquiring procedural mathematical skills with their clear methods and boundaries, students need to master the more subjective skills of reading, interpreting, representing and 'mathematicizing' a problem" (p. 55).

The National Council of Teachers of Mathematics has described five Process Standards that "highlight ways of acquiring and using content knowledge" (p. 29). The following Process Standards must be addressed throughout the learning and teaching of Indiana's Academic Standards for Mathematics in all grade levels in mathematics.

Problem Solving

- Build new mathematical knowledge through problem solving.
- Solve problems that arise in mathematics and in other contexts.
- Apply and adapt a variety of appropriate strategies to solve problems.
- Monitor and reflect on the process of mathematical problem solving.

Reasoning and Proof

- Recognize reasoning and proof as fundamental aspects of mathematics.
- Make and investigate mathematical conjectures.
- Develop and evaluate mathematical arguments and proofs.
- Select and use various types of reasoning and methods of proof.

Communication

- Organize and consolidate mathematical thinking through communication.
- Communicate mathematical thinking coherently and clearly to peers, teachers and others.
- Analyze and evaluate the mathematical thinking and strategies of others.
- Use the language of mathematics to express mathematical ideas precisely.

Connections

- Recognize and use connections among mathematical ideas.
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- Recognize and apply mathematics in contexts outside of mathematics.

Representation

- Create and use representations to organize, record and communicate mathematical ideas.
- Select, apply and translate among mathematical representations to solve problems.
- Use representations to model and interpret physical, social and mathematical phenomena.

In addition, estimation, mental computation and technology are areas that need to be addressed at all grade levels in mathematics.

Estimation and Mental Computation

- Know and apply appropriate methods for estimating the results of computations.
- Round numbers to a specified place value.
- Use estimation to decide whether answers are reasonable.
- Decide when estimation is an appropriate strategy for solving a problem.
- Determine appropriate accuracy and precision of measurements in problem situations.
- Use properties of numbers and operations to perform mental computation.
- Recognize when the numbers involved in a computation allow for a mental computation strategy.

Technology

- Technology should be used as a tool in mathematics education to support and extend the mathematics curriculum.
- Technology can contribute to concept development, simulation, representation, communication and problem solving.
- The challenge is to ensure that technology supports, but is not a substitute for, the development of skills with basic operations, quantitative reasoning and problem-solving skills.
  - Elementary students should learn how to perform thoroughly the basic arithmetic operations independent of the use of a calculator.
  - The focus must be on learning mathematics and using technology as a tool rather than as an end unto itself.

References

American Diploma Project (2004). *Ready or Not: Creating a High School Diploma that Counts.* Washington, D.C.: Achieve, Inc.

National Council of Teachers of Mathematics (2000). *Principles and Standards for School Mathematics.* Reston VA: author.

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